Pathway to the STARS Summer Bridge Program

BACKGROUND

The Pathway to the STARS Summer Bridge Program was created in 2002 and provides academic preparation and college acclimation for incoming science and technology freshmen. Forty-eight Science, Technology, Engineering, and Mathematics (STEM) majors participated in the 2006 program. The students were housed in campus dormitories and had meals in campus dining halls. Upper classmen served as peer mentors and tutors. Peer mentors lived in the dormitory, attended classes, and were involved in all activities with the bridge students.

Classroom instruction for the program typically includes algebra and trigonometry (pre-calculus), writing, and study skills. Students spend two days in an intense Mathematics Review Workshop at the beginning of the four week session. They attend workshops on time management, organizing course content, study skills, writing skills, writing formal reports, research methods, exam preparation, and stress management. In addition to the course work, students participate in evening study/work sessions with mentors. They also have leisure and cultural activities incorporated in each week's schedule (see Table 1).

Table 1: Pathway to the Stars Summer Bridge Sample Schedule Week I

Date	Time	Activity
June 21, 2006	7:30 a.m. - 8:30 a.m.	Move into Residence Halls
	8:30 a.m. – 5:00 p.m.	University Orientation
	6:00 p.m. - 8:00 p.m.	Orientation Dinner for students, parents and faculty
June 27 – July 21, 2006	7:30 a.m. - 8:15 am	Breakfast/Scott Dozier Dining Hall
	8:30 a.m. - 9:30 a.m.	Groups A and C Pre-Calculus Groups B and D Math Lab
	9:45 a.m. - 10:45 a.m.	Groups A and C Math Lab Groups B and D Pre-Calculus
	11:00 a.m. - 12:00 p.m.	Study Skills/Reading Diagnostic Testing/Writing Skills
	12:00 p.m. - 1:15 p.m.	Lunch
	1:30 p.m. - 2:30 p.m.	Groups A and C Pre-Calculus Groups B and D Math Lab
	2:45 p.m. - 3:45 p.m.	Groups A and C Math Lab Groups B and D Pre-Calculus
	4:00 p.m. - 4:30 p.m.	Study Skills Lab
	4:30 p.m.	Dinner/Scott Dozier Dining Hall
July 7, 2006	6:00 p.m. – 8:00 p.m.	Game Night
July 8, 2006	5:00 p.m. – 9:00 p.m.	Norfolk Tides
July 11, 2006	6:00 p.m. – 9:00 p.m.	Open Mike Night
July 15, 2006	12:00 p.m. – 8:00 p.m.	Visit Virginia Beach Resort

Calculus readiness is a major factor in the success of STEM students. Therefore, mathematics placement tests are administered to all participants before and after the Summer Bridge Program. Of the 48 students who participated in the 2006 program, only 2 placed in calculus or pre-calculus before the program began (first placement test). After the completion of the program, 39 students placed in calculus and 9 placed in pre-calculus (second placement test).

FUNDING REQUEST

While the Pathways to the STARS Summer Bridge Program has been highly successful in preparing incoming students for college life and calculus or pre-calculus, it only impacts about a quarter of each incoming science and technology freshman class. We would like to expand the program to include an additional 150 science and technology students each summer. Therefore, we request funding to support the program for the next 5 years to produce larger numbers of freshmen who become successful STEM graduates. In addition, coupled with previous findings, we could generate sufficient data to complete a longitudinal study on the program's impact and disseminate results. The one-year cost for the additional students is delineated in the table below.

Table 2: Estimated Annual Cost for the Pathway to the STARS Summer Bridge Program

Category	Need	Estimated Cost/First Year
Teachers	4 Teachers (1 month salary) @ $7,625	$ 30,500
Textbooks	150 College Algebra and Trig and My Math Lab @ 150 per book	$ 22,500
Housing	150 students @ $750 for 4 weeks	$112,500
Meals	150 students @ 448.50 for 4 weeks	$ 67,275
Stipends	150 students @ $500	$ 75,000
Mentors	20 @ @$1,500	$ 30,000
Total		$337,775

Support costs for 5 years with a 5% escalation factor each year total $1,866,421. The cost for each year appears in the table below.

Year	Estimated Cost
2007	$ 337,775
2008	$ 354,664
2009	$ 372,397
2010	$ 391,017
2011	$ 410,568
Grand total for 5 years	$1,866,421

CONCLUSION

The Pathways to the STARS Summer Bridge Program has been very successful at preparing a limited number of incoming freshmen student for successful matriculation in STEM areas at Norfolk State University. We propose to expand the program to include all of the students entering into the School of Science and Technology. This will increase the retention and the graduation rate in the school and ultimately, get more students into the pipe line toward the Ph.D. and other STEM graduate or professional degrees.

The Saturday Scientists Program

BACKGROUND

"The Saturday Scientists Program" is a science academy developed by the School of Science and Technology at Norfolk State University. This program is designed to foster student interest and improve students' performances in the sciences through practical applications. The Program was founded in 1993 to address three academic areas, biology, chemistry and physics. Currently the program addresses biology, chemistry, physics, engineering, computer science and mathematics. The Program, which currently relies on the altruism of faculty members from the School of Science and Technology who serve as the instructors, can maximally serve 40 students. The Program meets two Saturdays per month during the spring semester from 9:00 am to 11:30 pm for a total of eight sessions.

The high school junior and senior students are selected for program participation based on teacher recommendations. Students are assigned to academic areas based on their high school science schedule for the year. The students meet in the classrooms and laboratories of Norfolk State University's Woods Science Building to participate in college level enrichment activities and laboratories. Faculty members are asked to volunteer as instructors for the Program.

Over the years, the Program has been very successful. While evaluation has been informal, the following outcomes have been noted, increased numbers of student completing the program who choose career paths in the sciences, improved Advanced Placement scores, and improved SOL scores.

FUNDING REQUEST

The goal of the Norfolk State University Saturday Scientists Program is to bridge the gender and race/ethnicity gaps in mathematics and science skill development and college preparedness for Hampton Roads' high school students while fostering student interest in pursuing majors in the STEM (Science Technology Engineering and Mathematics) disciplines. While the goal of this program has remained constant, the objectives must change to meet the academic and technological advances of the 21st century. These objectives are as follows:

- To encourage students to declare mathematics, science, computer science or engineering as a major
- To promote academic achievement in mathematics, science and computer literacy
- To introduce high school students to the use of educational technologies that complement and strengthen their course curricula
- To provide inquiry-based opportunities for students to integrate knowledge
- To promote growth and high performance of students participating in standardized testing
- To help students develop an appreciation for science
- To give students the opportunity to experience university academics

- To facilitate the development of mentoring relationships between university scientists and high school students

In order to meet the new objectives expansion of the current program is necessary. To complete the experience for the students we would like to incorporate the following, a dedicated resource center, student stipends, field trips to places where science can be found (such as the Marine Science Museum, Goddard Space Center etc,), and paid student mentors from Norfolk State University's School of Science and Technology. Funding for instructors would allow us to offer the program during the fall and spring semesters to larger numbers of students. We would also like to endow a scholarship program to offer awards to seniors who participate in the program and enroll as students at NSU. Funding is requested for 5 years to support program operations and help with a longitudinal study to assess the impact of such outreach programs.

Category	Need	Estimated Cost
Scholarships	Funding is requested to establish an endowed scholarship program that will support 5 honor students (who were participants in the program) per year.	$500,000
Program Operations for 5 Years	Funding is requested to support the program operations. This budget will support development of a dedicated resource center, stipends for students, mentors and instructors, field trips, instructional and office supplies, mailings, and opening and closing activities for 5 years.	$750,000
Total		**$1,250,000**

WHY

The National Assessment of Educational Progress (NAEP), termed the "Nation's Report Card," reports lower assessment scores in math and science in 4th, 8th, and 12th grades, differentiated by race/ethnicity. These gaps are attributable to: 1) availability and use of technology, and 2) teacher quality. The first involves not just the lack of state-of-the art labs and equipment in schools, but results also from the "digital divide" by which low income and minority households are known to lack access to personal computers. Regarding the second, teacher quality: "Minority students are less likely to have teachers with master's degrees, less likely to have teachers in math or science courses that are trained or certified in math or science respectively, and less likely to have experienced teachers than are white students." The gap in minorities' pursuing baccalaureate and advanced degrees in math and science stems directly from these pre-college deficiencies.[1]

[1] Source: National Science Foundation, Women, Minorities, and Persons with Disabilities in Science and Engineering: 2002 (July 2003), pp. 9-10.

CONCLUSION

The School of Science and Technology, through the Saturday Scientists Program, is attempting to increase the number of minority students who pursue STEM careers. This outreach program has been quite successful and additional resources will provide this valuable support to larger numbers of high school students.

Health and Science Summer Academy

BACKGROUND

The "Health and Science Summer Academy" is an academic year science academy developed by the School of Science and Technology at Norfolk State University. The School of Science and Technology Health and Science Summer Academy is a two week non-residential academic enrichment program for motivated rising 9th, 10th, 11th, and 12th grade students from area high schools.

The goal of the Health and Science Summer Academy is to foster student interest and improve students' performances in the sciences through practical applications. The Program was founded in 2006 to address the STEM discipline areas of, biology, chemistry, computer science, physics, mathematics and the health sciences discipline areas of nursing and allied health.

FUNDING REQUEST

While the goal of the Health and Science Summer Academy remains the same, the length of the program time must be expanded in order to fully accomplish the Academy objectives. These objectives are as follows:

- To provide a four-week enrichment program in the sciences and health sciences
- To encourage students to declare health sciences, mathematics, science, computer science or engineering as a major
- To help students develop an appreciation for science
- To introduce students to the area of health sciences
- To give students the opportunity to experience university academics
- To provide role model experts in the fields of study
- To provide networking opportunities
- To provide reinforcement activities to high school science courses
- To facilitate the development of mentoring relationships between university scientists and high school students

In order to meet the new objectives, expansion of the current program is necessary. To complete the experience for the students, we would like to incorporate the following: four-weeks of instruction, student stipends, field trips to places where science can be found (such as the Marine Science Museum, Goddard Space Center, etc.), paid student mentors from Norfolk State University's School of Science and Technology and funding to support faculty participation. Therefore, we request funding to support the program for the next 5 years to produce larger numbers of high school students who become successful STEM college graduates. In addition, coupled with previous findings, we could generate sufficient data to complete a longitudinal study on the program's impact and disseminate results. The five-year total cost for the program is delineated in the table below.

Table 1: Support Costs for the Health and Science Summer Academy

Category	Need	Estimated Cost
Scholarships	Funding to establish an endowed scholarship program that will support 5 honor students (who were participants in the program) per year.	$500,000
Program Operations for 5 Years	Funding to support the program operations - student stipends, faculty and mentor stipends, field trips, supplies, mailings, and opening and closing activities.	$300,000
Total		**$800,000**

CONCLUSION

The National Assessment of Educational Progress (NAEP), termed the "Nation's Report Card," reports lower assessment scores in math and science in 4th, 8th, and 12th grades, differentiated by race/ethnicity. These gaps are attributable to: 1) availability and use of technology, and 2) teacher quality. The first involves not just the lack of state-of-the art labs and equipment in schools, but results also from the "digital divide" by which low income and minority households are known to lack access to personal computers. Regarding the second, teacher quality: "Minority students are less likely to have teachers with master's degrees, less likely to have teachers in math or science courses that are trained or certified in math or science respectively, and less likely to have experienced teachers than are white students." The gap in minorities' pursuing baccalaureate and advanced degrees in math and science stems directly from these pre-college deficiencies.[2] The School of Science and Technology, through the SST Health and Science Summer Academy, is seeking to bridge this gap.

[2] National Science Foundation, Women, Minorities, and Persons with Disabilities in Science and Engineering: 2002 (July 2003), pp. 9-10.